TEXTURE ANALYSIS OF TUMOR TISSUE IN MAGNETIC RESONANCE IMAGES OF BRAIN

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Abstract

One of the major problems in Neurosurgical planning is the precise localization of critical brain structures with respect to the tumor to define the safest possible surgical approach. Magnetic Resonance imaging makes it possible to non invasively obtain high resolution images of human brain.

In this paper, we present a generalized approach to the problem of segmentation of tumor with respect to other brain structure using Morphological operation i.e. dilation and erosion. Further, classification of Tumor Tissue and normal tissue is performed using Artificial Neural Network. Standard 256*256 pixel transverse T1,T2 and Proton Density MR Images acquired from 1.5 Tesla GE MR Scanner have been used for this study. The training of ANN was performed on MR Images, selected from series of images of 10 patients. A set of sixteen texture features are extracted from the tumor and the normal tissue regions. A grey tone spatial dependence matrix is used for extracting the statistical feature parameters. i.e. Angular Second moment, Contrast, Variance ,Entropy, Sum Entropy, Sum Variance, Homogeneity, Energy and Difference Entropy. This method is based on the estimation of the second order joint conditional probability density function. This texture feature vector is used for training of Back Propagation ANN.

Propagation ANN is up to 64%.

Keywords : MRI, Image Segmentation, Texture Classification, Artificial Neural Network